

## **PART IV DESIGN INFORMATION**

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## CHAPTER 11

### DESIGN GOALS

The purpose of the information in Chapters 11 through 14 is to provide engineers, designers, technicians, inspectors and others with a reference to City of Redmond's goals and standards for the planning and design of clearing and grading activities and stormwater management facilities.

The following general design goals (in this Chapter and in Chapter 13) are applied to clearing, grading and stormwater system designs in Redmond. General design goals are broad targets which indicate desirable outcomes, even though they may not be fully met in specific situations. Failure to completely meet a general design goal (e.g., minimize erosion and sedimentation) is not intended to constitute a deficiency subject to legal or procedural challenge. The goal must, however be reasonably addressed in specific situations. If an alternate approach to a project's stormwater management design would provide a significantly greater achievement of a goal without significant additional cost (monetary, land use, etc.) then the alternative could be considered an alternative that is reasonable and could be required under this Chapter. Specific situations can only be evaluated on a case-by-case basis.

#### **General Design Goals**

In Redmond, clearing, grading and stormwater management work should be done in a manner that reasonably addresses the following general design goals:

- A. Provide A Basic System Of Drainage -- One that: serves all lots and site improvements that are part of or affected by the project; directs runoff off of and away from buildings, traveled ways, and other developed surfaces; and provides water quality management where appropriate. Basic systems protect walkways, cross-walks, etc., from concentrated runoff flows (for example, by adding catch basins upslope of the walkways). (See also Chapter 2.)
- B. Prevent Flooding Of Inhabited Buildings -- Overflow and emergency runoff routes must be provided. Floodways adjacent to defined channels should accommodate flood flows (to at least the 100-year storm from fully developed upstream conditions).
- C. Minimize Erosion And Sedimentation -- Consider both on-site and downstream locations; many detention criteria are based on protecting streams from scour as well as from flooding.
- D. Minimize Water Quality Degradation -- Much of the newer code is focused on water quality, an evolving field that needs sound engineering applications.
- E. Protect Water-Related Habitat -- Refer to the Sensitive Area Code Requirements (contained in the Redmond Community Development Guide).

- F. Maintain Recharge And Subsurface Flow Patterns -- Maintaining groundwater supplies is important but do not increase recharge over natural conditions without careful hydrogeologic studies to avoid land stability problems. In areas of existing land stability concerns recharge should be reduced. Water quality is critical for recharge areas.
- G. Address "Real-World" Conditions -- Engineering designs should recognize that field conditions, debris and poor maintenance/repair practices exist which need to be considered so long-term viability is possible. Maintenance access and guidelines should be included with designs.
- H. Provide for Operation and Maintenance – Elements of the system proposed need to be capable of operating in the municipal context, have good access for maintenance and operation, and need to avoid very specialized parts, equipment, and operator qualifications whenever possible.
- I. Proceed Based On Clear, Professional Thinking -- Engineering documents submitted for approval must have clear concepts (including a narrative description if concepts are non-standard or not obvious) and design explanations, calculations, and other supporting information to show that the construction drawings implement the concepts.
- J. Meet Standards – Designs need to: (1) comply with City regulations and standards; (2) comply with accepted legal principles; (3) apply sound engineering principles; and (4) include alternatives or adjustments to enhance aesthetics.

## **CHAPTER 12**

### **DETAILED DESIGN STANDARDS**

Detailed Design Standards below are specific directions related to various project elements. All project elements shall comply with these standards unless specifically authorized otherwise.

#### **Grading**

Show existing and proposed lay of the land. Small projects can show runoff flow arrows, approximate slopes, and spot elevations as a minimum. Large projects shall provide contours. Contours must use the City of Redmond datum. The contour interval shall be based on the slope of the land. The contour interval is 2-foot or 5-foot; 1-foot intervals may be used if required by or approved by the Stormwater Engineer. For very flat sites spot elevations shall be provided. If part of the site is flat, provide a combination of contours and spot elevations.

#### **Infiltration Systems**

Closed infiltration systems shall have water quality pre-treatment of at least the water quality storm (and all water directed to such systems, if located in a well-head protection zone). Pretreatment will depend on the uses and activities in the contributing area. All design flows entering an infiltration system must have pretreatment (any variations must be approved by the Stormwater Engineer). Open-pond type infiltration systems may use "aquatards" as defined in the DOE Manual on the condition that excellent access is provided for equipment to periodically replace such filter material.

#### **Biofilters and Water Quality Ponds**

Biofilters sized for the water quality storm (see Section 20E.90.080(10).4 of Code, Appendix A-1) shall not be used to convey larger storms unless there is no feasible alternative and they are designed for such larger storms. Biofilter design for larger storms shall be based on a maximum velocity of four feet per second. If designed for larger storm conveyance, the design must comply with the DOE Manual. The size and shape of biofilters (and other surface features) need to be compatible with the terrain and not detract from the landscape value (the latter as determined by the Technical Committee).

## **Setbacks**

The tops and the toes of cut and fill slopes shall be set back from property boundaries as far as necessary for safety of the site and of adjacent properties and for the prevention of damage resulting from water runoff or erosion of the slopes. The tops and the toes of cut and fill slopes shall be set back from structures as far as is necessary for adequacy of foundation support and to prevent damage as a result of water runoff or erosion of the slopes. The City may require geotechnical/ engineering reports from the applicant and may require the applicant to pay for the City's costs for obtaining a peer review of any slope stability situations and set-backs from slopes.

## **Runoff Locations**

Runoff from upslope properties must be accepted at natural and established locations at property boundaries and be discharged at natural or established downslope locations along property boundaries or to a constructed drainage system if authorized, subject to required on-site quantity and quality controls.

## **Ground Slope**

The maximum ground slope on graded surfaces is 3 horizontal to 1 vertical (3:1) except as approved in association with roadway section in City rights-of-way where the maximum ground slope may be up to 2:1.

## **Standard Notes**

Include Standard Notes as shown in Appendix A-3 in all plan sets.

## **Horizontal Clearance and Crossing Angle**

The minimum horizontal spacing between closed storm drains and water mains, gas mains, other underground utility facilities, and all structures shall be five (5) feet horizontally. The minimum horizontal distance between any open storm drainage facilities (swales, open channels, biofilters, etc.) and water mains, gas mains and other underground facilities shall be ten (10) feet.

For pipe crossings, the preferred angle is 90 degrees, but 20 degrees either direction from 90 degrees is acceptable.

## **Vertical Clearance - Utilities**

The minimize vertical clearance spacing between the outside of storm drain pipelines and other pipelines/cables/conduits of other utility facilities, except sanitary sewers, shall be twelve (12) inches. For sanitary sewers, the vertical clearance shall be 18 inches, with the storm drain above the sanitary sewer. If this separation cannot be achieved due to other constraints, special construction techniques to protect each utility will be required.

## **Minimum Cover**

The standard minimum cover over storm drainage lines is dependent on the pipe material. The Redmond Design Standards and Specifications outline cover requirements.

## **Easements**

Where public storm drain line easements are necessary, they shall be fifteen (15) feet in width. Easement widths of less than 15 feet may be considered by the Stormwater Division if the full width is not obtainable.

Publicly maintained bioswales and detention systems shall be located in tracts dedicated to the City. The size of the tract shall be based on the size of the stormwater facility. At a minimum, the tract shall include the entire facility, site access area and at least 5 feet around the facility. In limited cases an easement may be permitted. If an easement is permitted dimensions shall be determined by the Stormwater Division.

In cases where pipes and/or other facilities are deeper than 8 feet or have other special conditions, larger tracts or easements may be required.

All easements needed for City stormwater systems shall be provided by the developer in the name of the City. The required easements shall be shown on the construction drawings and the easement legal description or plat markup shall be submitted for review at the same time construction drawings are submitted for review.

Easements shall be prepared on City of Redmond standard forms.

An alternative to separately recording a standard easement form is to record an easement on the face of a plat. If this is the method used, a standard City of Redmond easement statement shall be included in the plat documents.

Buildings, structures, garages, carports, dumpster enclosures, decks, etc., shall not be located in easement areas.

## **Fire Hydrants Near Detention Systems**

Public detention systems shall (and private systems should) have a fire hydrant located within 100 feet of the control structure for maintenance.

## **Trees**

Trees shall not be located within 8 feet horizontally from pipe unless approved by the Stormwater Engineer.

## **Unstable Soils**

Unstable soil conditions, such as peat, shall be removed from under pipes unless special measures are approved by the Stormwater Engineer.

## **Rockerries/Retaining Walls**

Rockerries or retaining walls should not cross or be near storm drain pipes. Any crossing of a wall shall be perpendicular to the wall and special construction techniques including steel casings may be required.

## **Access Roads**

Unless specifically waived by the Stormwater Engineer, all stormwater facilities shall be accessible to maintenance vehicles. If not located in or adjacent to a vehicle access way, then access by an improved roadway surface shall be provided. Materials of construction for an improved roadway surface may include asphalt concrete, cement concrete, structurally stabilized vegetated surface, crushed surfacing, or other surfacing as approved by the Stormwater Engineer. Access roads shall be designed with 35 foot inside radius on curves, with slopes less than 15% and with widths as determined by the Stormwater Engineer (but not less than 10 feet). The Stormwater Engineer may require access ways to be located in separate tracts.

## **Maximum and Minimum Slopes**

Maximum slope on storm drain lines is 20%, unless approved by the Stormwater Engineer. Minimum slope on storm drain lines is 0.25%.

## **Structure Requirements**

1. **Structure Spacing** -- Structures shall be installed at a preferred maximum 350 foot spacing. A maximum 400 foot spacing may be approved by the Stormwater Engineer. Structures shall be installed at the end of all dead end mainlines and at junctions of mainlines for access.
2. **Profile Call Outs** -- Structure callouts in the profile shall include structure number, stationing, type, size, and compass locations of penetrations, and shall be shown complete for each structure shown on the plans. Inlet pipe crowns shall not be lower than outlet pipe crowns unless specifically waived by the Stormwater Engineer.

|          |              |                       |
|----------|--------------|-----------------------|
| Example: | MH #2,       | Type II-48            |
| 4.       | 348.75 - 12" | N in                  |
| 5.       | 348.95 - 12" | S in                  |
| 6.       | 348.75 - 36" | E in detention system |
| 7.       | 348.75 - 8"  | E in                  |
| 8.       | 348.65 - 8"  | W out                 |



3. Plan Callouts -- Structure callouts in the plan view shall include structure number, type, and size.
4. Knockouts -- Knockouts shall be provided in structures where future extensions are anticipated. These shall be shown on the plans.
5. Drop Structures -- Drop structures shall only be allowed where approved by the Stormwater Development Review Engineer. Generally, drop structures will not be approved if the drop is less than 5 feet.
6. Maximum Depth -- The maximum depth of a structure without special detailed design shall be 25 feet.
7. Through Curb Inlet Frames -- Through curb inlet frames shall be specified on plans at sag points, at any inlet where by-passing runoff would escape the intended control system and at every third inlet on a continuous run along a continuous slope. Through curb inlet frames may be used at all points except at proposed or likely driveway locations.
8. Grates -- Vaned grates shall be used on all slopes over five percent. Herringbone grates may be used on flatter slopes. All grates are to be ductile iron.

### **Single Family Roof and Foundation Drain Requirements**

1. Size and Connection -- Roof drain/foundation drain connection from the house shall be 6-inch diameter and shall be extended to a storm drain structure (not connected directly to a storm drain pipe). Foundation drains shall be separate from roof drains around the building foundation. Pipes shall be smooth wall, rigid type (sewer grade). Pipes shall not be corrugated polyethylene (such as flexible ADS).
2. Building Footings -- Building footings shall be designed, or pipe located, such that the footing shall not bear on the pipe.
3. Rockerries/Retaining Walls -- Rockeries or retaining walls shall not cross or be near roof drains. Exceptions shall only be approved by the Stormwater Engineer. Any crossing of a wall shall be generally perpendicular to the wall and special construction techniques including steel casings shall be required. Rockeries and retaining walls shall have foundation drains (6 inches in diameter of approved materials) behind the wall connected to a defined conveyance system. Rockeries 48 inches and over and retaining walls must be designed by a geotechnical engineer. No retaining structure may be higher than 8 feet (unless a variance is obtained).

## **Erosion Control Requirements**

The applicant shall show on the construction drawings all pertinent information within 50 feet of disturbed areas.

## **Contours**

Proposed contours must not create undrained, ponding areas where such areas would not be appropriate (onsite or offsite).

Contours of the same elevation beside each other must have high or low spot elevations between them.

Inlet and outfall inverts must make sense with grading contours.

## **Swales**

Grading of swales must be shown. If contours are not closer together than 50 feet, spot elevations every 50 feet are required. Also, spot elevations are required at the beginning and end of the swale.

## **As-Built Drawings**

Before acceptance of improvements an As-Built plan shall be prepared by a Professional Land Surveyor or Civil Engineer licensed in the State of Washington. The As-Built plan is to include accurate locations, elevations and sizes of all constructed features. As-Built documents will bear the signature, stamp and date of the licensed Land Surveyor preparing them. Contact the Public Works Engineering Division for detailed, current requirements

## **Check Specific Project Requirements**

Make sure proposed construction meets the commitments and requirements in project documents such as SEPA Checklists (EIS, if done for the project), site plan approvals, special permits, and other such project documents.

## **Include Basic Information Regarding the Project**

The lead sheet (at a minimum) should identify the property (tax lot, address, vicinity map) and summarize information required to compute monthly stormwater fee [include total square feet of tax lot(s) comprising the project, square feet of proposed impervious area, water quantity control design storm(s), and water quality facilities with the design storm for each facility].

# **CHAPTER 13**

## **GENERAL TEMPORARY EROSION AND SEDIMENT CONTROL (TESC) STRATEGIES**

This chapter outlines the general strategies to use for reducing sediment in runoff from construction sites. Additional details are provided in Chapter 14.

The Temporary Erosion and Sediment Control (TESC) Plan must specify and detail measures that are appropriate for the site and the project.

Field adjustments will likely be required as the project progresses. Such adjustments must also be consistent with this Notebook and the DOE Manual.

Regular attention needs to be paid to the TESC measures during construction. Actions need to be taken so that the contractor controls the runoff and sediment from the site. The following are general strategies for temporary erosion and sediment control in Redmond:

### **1. Propose a Site Development Plan Which is Compatible with the Site**

Plan the use of the site, or adjust critical parts of the site plan, to avoid potential runoff and erosion problems. Changing a site plan to avoid construction problems is not often done but could be considered in exceptional circumstances.

- See DOE Manual, page II-1-6, for more information.

### **2. Provide an "Enhanced" Temporary Erosion and Sediment Control Plan, When Appropriate**

Local engineering firms generally prepare formal TESC Plans. They have considerable expertise and experience, in most cases. In certain cases, an enhanced plan (better suited to a specific site and specific project than a basic plan that meets only minimum standards) is warranted. The most basic TESC plan is called Level 1 in this Notebook. For certain sites, enhanced TESC Plans described under Rainy-Season Site Work, may be needed.

### **3. Prevent Tracking Of Mud From The Site Onto Off-Site Streets**

Apply stable surfaces to the site that can be cleaned (ATB for example).

Provide a vehicle wash rack.

If dirt does leave the site, use a sweeper truck; do not flush the street.

→ See DOE Manual, Page II-5-30.

#### **4. Add Special Measures For Specific Potential Problem Areas**

→ See DOE Manual, Chapter II-3.

#### **5. Provide Regular TESC Inspections to Verify TESC is Correct and Adequate**

Perform regular inspection, repair and adjustment of the TESC measures. The City will assume that the person designated by the Owner as TESC Contact is responsible for TESC inspection, unless informed otherwise.

If construction runoff is being discharged to "waters of the State", then the project must not cause those waters to increase in turbidity more than 5 NTU's over the existing clarity of those waters. If the construction is being discharged to a City storm drain system, the clarity readings that exceed 50 NTU's indicate that additional TESC measures are needed (if feasible).

Check off-site public streets and clean them if dirt or mud has been tracked from the site. Do not flush streets into unprotected storm systems.

Owners and contractors may add some new ideas if they are in addition to minimum plan requirements and City inspectors are informed in advance and have no objection. Good temporary runoff and erosion control methods are still being developed, each site is different and the methods often need to change with seasons, weather, and project phases; the TESC is dynamic and needs continual attention during the project.

#### **6. Avoid (or Phase) Earthwork in the Rainy Season**

Generally, the rainy season is from October 1 through April 30. Schedule major earthwork on projects to avoid this season if possible. Consider the Rough Grading Permit discussed in Chapter 12 to get grading completed in good weather, prior to the rainy season.

For certain sites, grading work may not be permitted in the rainy season. Note that the Director may adjust dates during a particular year to reflect actual weather conditions. Grading work that is **not permitted** during the rainy season includes:

- Work in streams or their buffers.
- Work in wetlands or their buffers.
- All other sites are classified as outlined below:

Redmond Municipal Code requires all projects (except those with very minor grading) to have Temporary Erosion and Sediment Control Plans (TESC Plans). The plans are to include Best Management Practices (BMPs) to the maximum extent practical to address potential runoff increases and potential decreases in water quality (20E.70.080). The Code also gives the Public Works Director authority to suspend work during periods of inclement weather including the entire rainy season.

Different sites and different types of site work create different potentials for runoff quantity and quality problems. This section groups sites and the proposed work into different classifications and identifies which projects should be able to do site work in rainy weather and which should not. The rainy-season is generally from October 1 through April 30. This section provides guidance; particular circumstances will be considered in the City's decisions regarding a particular site and project.

To provide guidance about different sites and different types of site work, the following factors are considered:

**Site Work** is defined as including all clearing and grading, installation of utilities, and any other on-site activities which disturb earth, making it susceptible to erosion.

**Project Area** is the total amount of a site that will be disturbed by the project. It is expressed in acres. Categories used in this document are:

- Size A (up to 1 acre)
- Size B (over 1 acre, up to 5 acres)
- Size C (over 5 acres, up to 25 acres)
- Size D (over 25 acres)

For those familiar with previous projects in Redmond, the following are examples of the size categories:

- **Size A:** Boston Market (Redmond Way at 167th Avenue NE)
- **Size B:** Old Redmond Townhomes (Old Redmond Road just above West Lake Sammamish Parkway)
- **Size C:** Townhomes on the Rivertrail (just north of City Hall)  
Eddie Bauer (Overlake Area)  
Microsoft's Pebble Beach (along NE 40th at 163rd Avenue NE)

- Size D: Redmond Town Center (south part of downtown Redmond)  
Microsoft's Redmond West Campus (On 148th Avenue NE  
between NE 51st and NE 60th Streets)

**Relationship To Receiving Water** describes how a project site is situated with respect to surface waters which could be impacted. Four classifications are used:

- Virtually no relationship: means site runoff generally would not affect receiving waters in the area at all or in any measurable way.
- Near Sensitive Area or Buffer: means one or more sensitive areas or their buffers (as defined in the Community Development Guide) is located where it could be directly affected by site runoff (generally downslope from the work area).
- Stream work involved: means project activities actually include work which physically disturbs a surface water.
- Wetland or Buffer work involved: means project activities actually include work which physically disturbs wetlands or buffer areas.

**Slope at the site where work is to occur.** Slope classifications are shown in the following charts where they are expressed in slope percentages.

Slope percentage is the change in elevation divided by the horizontal distance between two points on the ground surface (then multiplied by 100 to express results as a percentage). A change in elevation of 5 feet over a 20-foot (horizontal) distance would have a slope equal to 5 divided by 20 (equals 0.25) times 100 which equals 25 percent. See the following charts for slope classifications.

**Surface Permeability** is a factor considered because some sites allow percolation to such an extent that runoff problems are much less likely. Sites in Redmond with high percolation generally occur on flat sites and are given special consideration in the Charts.

In effect, the following charts consider two classifications for surface permeability:

- Highly permeable (soils in SCS Group A and some Group B soils).
- All others.

**Maximum Disturbed Area** refers to the area being disturbed at any one time. Projects can often phase construction so that the maximum area disturbed at any one time is limited in size. Such limits reduce potential for runoff problems. Once an area of a project is "secured" with non-erodible materials such as the initial paving, foundation slabs, etc., the next area may be started.

Disturbed areas are classified as:

- Small (up to 1 acre)
- Medium (up to about 5 acres)
- Large (over 5 acres)

Note that this factor can often be controlled by the project design and its TESC Plan.

**Quality Of The TESC Plan** makes a significant difference in the potential for winter runoff problems. Generally, quality improves when special attention, additional expertise, and more time and money is applied to the TESC Plan. In this Guidance Document the following levels of TESC Plan quality are used:

**Level 1 TESC Plans:** The project's engineers focus on standard erosion and sediment control measures in conventional ways for the type of site and project.

**Level 2 TESC Plan:** The TESC Plan level is prepared by the applicant's engineers and is carefully adjusted to deal with specific site and project issues. The Plan is still developed by the project's engineer and reviewed by the City's plan review engineer. At this level, however, the TESC Plan is to be accompanied by a written summary of specific site and project issues and identification of how the TESC measures address the specific issues.

**Level 3 TESC Plan:** The Plan is still drawn by the project's engineers and reviewed by the City's plan review engineer and still must provide the written summary but the plan elements are formulated and reviewed by a team which includes at least the following people:

- Project's TESC Engineer(s)
- The Applicant's Project Manager
- The General Contractor
- The TESC or Grading Contractor (or equal)
- City's Stormwater Engineer
- City's Inspector(s)

This team must reach consensus that the plan is feasible, that it addresses anticipated site and project issues, that it provides feasible phasing, (if applicable), and that it will have an excellent chance to do a satisfactory job of controlling erosion and sediment during construction.

Particularly for Levels 2 and 3, sufficient space must exist on site to allow necessary BMPs. If the BMPs can't fit on the site and still allow the site work to occur, the site should not be worked in the rainy season.

A vehicle wash rack is required for winter work at a site that has any significant number of vehicles entering and leaving the site before the site has installed asphalt treated base (ATB) or similar working surfaces.

All TESC Plan levels are required to include a 24-hour/day, 7-day/week, local contact person, designated by the applicant. The contact (and/or alternate) must be available and be identified at the Pre-Construction Conference. The contact person (and/or alternate) must have the authority to authorize and direct TESC work and TESC expenditures on the site.

**The Charts** which follow provide guidance as to when a site and project may proceed in the rainy season.

The charts show that many sites can, in general, be worked in the rainy season. In most cases special attention to the TESC Plan is required.

Work in streams, wetlands or their buffers is not permitted in the rainy season. Steep sloping sites should not be worked in the rainy season unless they have virtually no potential to pollute surface waters.

Generally, a separate Rough Grading Permit should not be issued in the rainy season since a site should only be started when all work is ready to proceed as quickly as possible.

- A. Find which of the four charts apply to the project based on the total area (not phased area) to be disturbed by the project. The title on the charts indicate the size.
  - Size A -- Up to 1 acre
  - Size B -- Up to 5 acres
  - Size C -- Up to 25 acres
  - Size D -- Over 25 acres
- B. Using the chart for the total project area, look at Column B and determine the relationship of the project to receiving waters.
- C. For the row of the Chart selected in Column B, look in Column C and determine the steepest slopes to be disturbed over a significant part of the project.
- D. For the row selected in Column C, continue to the right to select the soil permeability (if applicable) in Column D.
- E. For the row selected in Column D, next check Column E. Column E reflects the maximum area to be disturbed at one time (during the rainy season). Please note that this factor can be controlled, for many projects, by the project's applicant and the project's designers.



- F. Continue moving right, to Column F which then specifies the required quality of the TESC Plan. See preceding discussion under "Factors to Consider". Again, the project team can control this factor although City staff time availability becomes a critical element for TESC Plan formulation.
- G. Continuing right into Column G shows the general guidance about working in the rainy season.
- H. Column H is simply a label one can use for the site type to facilitate reference.

Please note that City staff time availability is a factor which enters into the other factors. Exceptional TESC Plans require City staff input and sufficient inspection time is critical in the rainy season. If City staff time is not sufficient, rainy season work should not proceed.

### ***Examples***

**Manhattan Square (a.k.a. Old Redmond Road Townhomes)** on Old Redmond Road is now completed. In the charts, it would be a Size B site with little relationship to receiving water quality. Slopes are over 15 percent. Even if phasing were proposed (to provide small-size earth exposure) Level 3 TESC plan is needed. Level 3 requires space for TESC facilities which was not available on-site. The rainy-season permits should be denied.

**East Point** is also a Size B project. It is located near Bear Creek (a sensitive area) but the site has flat permeable soils. With at least a Level 2 TESC Plan (and adequate inspector time available) this site could go forward in winter. Special precautions would be needed to prevent Bear Creek flood flows from encroaching onto bare earth (part of a Level 2 TESC Plan).

**Microsoft's Pebble Beach** is a Size C project on moderate slopes (not permeable soils) with sensitive areas applicable. With phased construction, a Level 3 TESC Plan, and plenty of TESC space available (and adequate City inspection staff availability), it was able to go forward in the rainy season.

**Redmond Town Center** is classified as a Size D project. It is located on a flat site near sensitive areas and has predominately permeable soils. The structural fill being used is pit run gravel, permeable material. The minimum TESC Plan is Level 1. Rainy season work was acceptable.

**Chart 13-1**  
**Size A Project Area (To One Acre)**

| <b>B</b>                                                     | <b>C</b>                           | <b>D</b>                           | <b>E</b>                             | <b>F</b>                                         | <b>G</b>                                    | <b>H</b>         |
|--------------------------------------------------------------|------------------------------------|------------------------------------|--------------------------------------|--------------------------------------------------|---------------------------------------------|------------------|
| <b>Relation To Receiving Waters</b>                          | <b>Slope Within Disturbed Area</b> | <b>Site's Surface Permeability</b> | <b>Maximum Area Of Exposed Earth</b> | <b>Quality &amp; Content Of TESC Plan; Level</b> | <b>Guidelines For Work In Rainy Season*</b> | <b>Site Type</b> |
| Virtually<br><br>No<br><br>Relationship                      | 0-10%                              | N/A                                | N/A                                  | 1                                                | Yes                                         | A1               |
|                                                              | 10-15%                             | N/A                                | N/A                                  | 2                                                | Yes                                         | A2               |
|                                                              | Over 15%                           | N/A                                | N/A                                  | 2                                                | Yes                                         | A3               |
| Sensitive Area<br><br>Or Buffer Near<br><br>(and Down-Slope) | 0-10%                              | N/A                                | N/A                                  | 2                                                | Yes                                         | A4               |
|                                                              | 10-15%                             | N/A                                | N/A                                  | 2                                                | Yes                                         | A5               |
|                                                              | Over 15%                           | N/A                                | N/A                                  | N/A                                              | No                                          | A6               |
| Stream Work Involved                                         |                                    |                                    |                                      |                                                  | No                                          | A7               |
| Wetland Or Buffer Work Involved                              |                                    |                                    |                                      |                                                  | No                                          | A8               |

\* Rainy season is generally October 1 through April 30 (or as adjusted by the Public Works director for actual weather conditions during a particular year).

**Chart 13-2**  
**Size B Project Area (To Five Acres)**

| <b>B</b>                                       | <b>C</b>                           | <b>D</b>                             | <b>E</b>                             | <b>F</b>                                         | <b>G</b>                                    | <b>H</b>         |
|------------------------------------------------|------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------------------|---------------------------------------------|------------------|
| <b>Relation To Receiving Waters</b>            | <b>Slope Within Disturbed Area</b> | <b>Site's Surface Permeability**</b> | <b>Maximum Area Of Exposed Earth</b> | <b>Quality &amp; Content Of TESC Plan; Level</b> | <b>Guidelines For Work In Rainy Season*</b> | <b>Site Type</b> |
| Virtually No Relationship                      | 0-5%                               | P                                    | N/A                                  | 1                                                | Yes                                         | B1               |
|                                                | 0-5%                               | N/P                                  | N/A                                  | 2                                                | Yes                                         | B2               |
|                                                | 5-10%                              | N/A                                  | N/A                                  | 2                                                | Yes                                         | B3               |
|                                                | 10-15%                             | N/A                                  | N/A                                  | 3                                                | Yes                                         | B4               |
|                                                | Over 15%                           | N/A                                  | 1 acre                               | 3                                                | Yes                                         | B5               |
| Sensitive Area Or Buffer Near (And Down-Slope) | 0-5%                               | P                                    | N/A                                  | 2                                                | Yes                                         | B6               |
|                                                | 0-5%                               | N/P                                  | N/A                                  | 2                                                | Yes                                         | B7               |
|                                                | 5-10%                              | N/A                                  | N/A                                  | 2                                                | Yes                                         | B8               |
|                                                | 10-15%                             | N/A                                  | 1 acre                               | 3                                                | Yes                                         | B9               |
|                                                | Over 15%                           | N/A                                  | N/A                                  | N/A                                              | No                                          | B10              |
| Stream Work Involved                           |                                    |                                      |                                      |                                                  | No                                          | B11              |
| Wetland Or Buffer Work Involved                |                                    |                                      |                                      |                                                  | No                                          | B12              |

\* Rainy season is generally October 1 through April 30 (or as adjusted by the Public Works director for actual weather conditions during a particular year).

\*\* P means mostly permeable (SCS Group A and, in some cases Group B soils).

N/P means mostly not permeable.

**Chart 13-3**  
**Size C Project Area (To Twenty-Five Acres)**

| <b>B</b>                                       | <b>C</b>                           | <b>D</b>                             | <b>E</b>                             | <b>F</b>                                         | <b>G</b>                                    | <b>H</b>         |
|------------------------------------------------|------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------------------|---------------------------------------------|------------------|
| <b>Relation To Receiving Waters</b>            | <b>Slope Within Disturbed Area</b> | <b>Site's Surface Permeability**</b> | <b>Maximum Area Of Exposed Earth</b> | <b>Quality &amp; Content Of TESC Plan; Level</b> | <b>Guidelines For Work In Rainy Season*</b> | <b>Site Type</b> |
| Virtually No Relationship                      | 0-5%                               | P                                    | N/A (If A soils used as fill)        | 1                                                | Yes                                         | C1               |
|                                                | 0-5%                               | N/P                                  | 5 acres                              | 2                                                | Yes                                         | C2               |
|                                                | 5-10%                              | N/A                                  | 5 acres                              | 2                                                | Yes                                         | C3               |
|                                                | 10-15%                             | N/A                                  | 5 acres                              | 3                                                | Yes                                         | C4               |
|                                                | Over 15%                           | N/A                                  | 1 acre                               | 3                                                | Yes                                         | C5               |
| Sensitive Area Or Buffer Near (And Down-Slope) | 0-5%                               | P                                    | N/A (If A soils used as fill)        | 2                                                | Yes                                         | C6               |
|                                                | 0-5%                               | N/P                                  | 1 acre                               | 2                                                | Yes                                         | C7               |
|                                                | 5-10%                              | N/A                                  | 1 acre                               | 3                                                | Yes                                         | C8               |
|                                                | 10-15%                             | N/A                                  | 1 acre                               | 3                                                | Yes                                         | C9               |
|                                                | Over 15%                           | N/A                                  | N/A                                  | N/A                                              | No                                          | C10              |
| Stream Work Involved                           |                                    |                                      |                                      |                                                  | No                                          | C11              |
| Wetland Or Buffer Work Involved                |                                    |                                      |                                      |                                                  | No                                          | C12              |

\* Rainy season is generally October 1 through April 30 (or as adjusted by the Public Works director for actual weather conditions during a particular year).

\*\* P means mostly permeable (SCS Group A and, in some cases Group B soils).

N/P means mostly not permeable.

**Chart 13-3**  
**Size D Project Area (Over Twenty-Five Acres)**

| <b>B</b>                                       | <b>C</b>                           | <b>D</b>                             | <b>E</b>                             | <b>F</b>                                         | <b>G</b>                                    | <b>H</b>         |
|------------------------------------------------|------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------------------|---------------------------------------------|------------------|
| <b>Relation To Receiving Waters</b>            | <b>Slope Within Disturbed Area</b> | <b>Site's Surface Permeability**</b> | <b>Maximum Area Of Exposed Earth</b> | <b>Quality &amp; Content Of TESC Plan; Level</b> | <b>Guidelines For Work In Rainy Season*</b> | <b>Site Type</b> |
| Virtually No Relationship                      | 0-5%                               | P                                    | N/A (If A soils used as fill)        | 1                                                | Yes                                         | D1               |
|                                                | 0-5%                               | N/P                                  | 5 acres                              | 2                                                | Yes                                         | D2               |
|                                                | 5-10%                              | N/A                                  | 5 acres                              | 2                                                | Yes                                         | D3               |
|                                                | 10-15%                             | N/A                                  | 5 acres                              | 3                                                | Yes                                         | D4               |
|                                                | Over 15%                           | N/A                                  | 1 acre                               | 3                                                | Yes                                         | D5               |
| Sensitive Area Or Buffer Near (And Down-Slope) | 0-5%                               | P                                    | N/A (If A soils used as fill)        | 1                                                | Yes                                         | D6               |
|                                                | 0-5%                               | N/P                                  | 1 acre                               | 2                                                | Yes                                         | D7               |
|                                                | 5-10%                              | N/A                                  | 1 acre                               | 3                                                | Yes                                         | D8               |
|                                                | 10-15%                             | N/A                                  | 1 acre                               | 3                                                | Yes                                         | D9               |
|                                                | Over 15%                           | N/A                                  | N/A                                  | N/A                                              | No                                          | D10              |
| Stream Work Involved                           |                                    |                                      |                                      |                                                  | No                                          | D11              |
| Wetland Or Buffer Work Involved                |                                    |                                      |                                      |                                                  | No                                          | D12              |

\* Rainy season is generally October 1 through April 30 (or as adjusted by the Public Works director for actual weather conditions during a particular year).

\*\* P means mostly permeable (SCS Group A and, in some cases Group B soils).

N/P means mostly not permeable.

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# **CHAPTER 14**

## **DETAILED TEMPORARY EROSION AND SEDIMENT CONTROL (TESC) STANDARDS**

Detailed Temporary Erosion and Sediment Control (TESC) Standards are specific directions that projects must address.

### **1. Fully Identify Work**

Show areas to be cleared and graded, stockpile areas, staging areas, etc. Provide sequence of construction for each project sub-phase.

### **2. Stabilized Construction Entrance**

Safe ingress/egress point(s) shall be established for access to construction areas. Whenever practical, the access shall be limited to one location. The access shall be constructed and maintained to minimize the tracking of soil off site (see City of Redmond standard detail #503).

### **3. Stabilization Of Disturbed Areas**

All exposed soil shall be stabilized by suitable application of Best Management Practices (BMPs), including but not limited to sod or other vegetation, plastic covering, mulching, or application of gravel base on areas to be paved. All BMPs shall be selected, designed and maintained in accordance with the approved Manual. From October 1 through April 30, no unworked soil shall remain exposed for more than 48 hours (including all calendar days; holidays, Sundays, etc.). From May 1 through September 30, no unworked soil shall remain exposed for more than 7 days. Rainy season work guidelines may also apply.

### **4. Estimate of Quantities**

Show on the plans the quantity of clearing area (in acres) and earthwork (in cubic yards).

### **5. Timing and Stabilization of Sediment Trapping Measures**

Clearing limit fences, sediment ponds and traps, perimeter dikes, sediment barriers, and other BMPs intended to trap sediment on-site shall be constructed as an initial project activity and shall be approved by a City Inspector before mass grading or further site disturbance. These BMPs shall be functional before land disturbing activities take place. Earthen structures such as dams, dikes, and diversions shall be seeded and mulched.

## **6. Cut and Fill Slopes**

Cut and fill slopes shall be designed and constructed in a manner that will minimize erosion; refer to DOE Manual.

## **7. Stabilization of Temporary Conveyance Channels and Outlets**

All temporary on-site conveyance channels shall be designed, constructed and stabilized to prevent erosion from the expected velocity of flow from a 10-year, 24-hour frequency storm for the developed condition. Stabilization adequate to prevent erosion of outlets, adjacent stream banks, slopes and downstream reaches shall be provided at the outlets of all conveyance systems.

## **8. Storm Drain Inlet Protection**

All storm drain inlets made operable during construction shall be protected so that stormwater runoff shall not enter the conveyance system without first being filtered or otherwise treated to remove sediment and other potential pollutants.

## **9. Underground Utility Constructions**

The construction of underground utility lines shall be subject to the following criteria:

- a. Where feasible, no more than 300 feet of trench shall be opened at one time.
- b. Excavated material shall be placed in locations consistent with safety and space considerations. Excavated material shall be placed on the uphill side of trenches where possible.
- c. Trench dewatering devices shall discharge into a sediment trap or sediment pond as a minimum BMP.

## **10. Construction Access Routes**

Wherever construction vehicle access routes intersect paved roads, provisions must be made to minimize the transport of sediment (dirt or mud) onto the paved road. If sediment is transported onto the road surface, the roads shall be immediately cleaned. Sediment shall be removed from roads by shoveling, vacuuming or sweeping and be transported to a controlled sediment disposal area. Flushing to storm drains is not permitted. Construction vehicle wash stations may be required.



## **11. Removal of Temporary BMPs**

All temporary erosion and sediment control BMPs shall be removed within 30 days after final site stabilization is achieved or after the temporary BMPs are no longer needed.

Trapped sediment shall be removed or stabilized on site. Disturbed soil areas resulting from removal shall be permanently stabilized.

## **12. Erosion Control Requirements**

Erosion protection will be required for all disturbed areas when clearing/grading approval is required.

All sediment laden runoff must flow through an approved filter fabric fence. In limited cases, where the site is flat and has excellent percolation characteristics, all sediment laden runoff may be retained onsite.

The erosion control measures must function throughout the construction time period.

No sediment laden water may drain to a permanent infiltration system or be ponded within 10 feet of a future infiltration area.

## **13. Limits Of Clearing**

Clearing limits must be very clearly designated on the plans.

All clearing limits must be fenced (so designate on plans).

Clearing Limit fence must be a minimum of 42-inch orange safety fence (Exxon Safety/Barrier Fence, Tenax Beacon, or equal). Post type and spacing as recommended by manufacturer.

Clearing Limit fence is not needed in area where approved silt fence is used.

In flat areas (slope < 2%) where no trees are within 50 feet of the clearing limit, a single strand of wire 18" to 24" above the ground tied with survey tape may be approved on a case by case basis by the Construction Division.

The area allowed to be graded at one time may be limited by the Technical Committee approval.

#### **14. Filter Fence**

Filter fence should be used in areas where the flow over disturbed areas is perpendicular to the fence. When the flow would be angled or parallel to the fence, a berm or swale should be used to direct the flow to a trapping area.

Sediment should be removed from the filter fence when it has accumulated to half of the design depth.

#### **15. Swales**

Swales should be piped in areas where vehicles will frequently cross.

#### **16. Stockpiling**

Stockpiling may be permitted if the following conditions are met:

A significant amount of material would be required to be removed from the site, and then returned, causing impacts to city streets.

The material can be stored onsite in an area planned to be cleared later.

The stockpile area has a slope of 10% or less.

The stockpile will have minimum visual impact on the surrounding area. Proximity of public areas to stockpile area will determine the size and height permitted. No stockpiling over 8 feet will be permitted.

Stockpile will be temporary. Duration not to exceed permitted construction activity.

Stockpile areas must have the note "Stockpile area to be covered with Visqueen plastic (minimum 6 mil) when not in use. Visqueen is to be held down by a minimum of 10 lb. sand bags placed every 15 feet along the edge and across the pile."

Stockpile area must have silt fence around the entire area. An opening to access pile should be made from the uphill side. The opening should be closed with silt fence when not in use.

The stockpile must be identified on the TESC plan.

## **17. Sequence of Construction**

The written construction sequence must describe in detail how construction activities will proceed through the life of the project.

The written sequence must reflect logical, orderly and feasible implementation of TESC measures. The detail provided in the construction sequence shall be proportional to the complexity of the project and the sensitivity of the affected environments.

The written sequence shall note points where City Inspection is needed prior to proceeding with further work.

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# **CHAPTER 15**

## **STANDARDS FOR**

### **ENGINEERING DRAWINGS**

The standards for engineering drawings are maintained by the Engineering Division of the Public Works Department. Detailed information is available from that division.

The standards apply to engineering drawings for clearing, grading and stormwater projects classified in this notebook as “Large Projects”. The standards should be consulted for Small Projects although considerable flexibility exists to suit drawings to the project.

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